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Indian Standard

COLOUR PICTURE TUBE WITH ELECTROSTATIC FOCUSSING AND ELECTROMAGNETIC DEFLECTION FOR COLOUR TELEVISION RECEIVERS – BLANK DETAIL – SPECIFICATION

UDC 621·397·331·242 : 621-397.446

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

December 1993 **Price Group 3**

Electron Tubes Sectional Committee, LTD 9

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards on the recommendation of Electron Tubes Sectional Committee (LTD 9) and approval of Electronics and Telecommunication Division Council.

This Standard is derived from the provisional Specification PQC 98 'Blank Detail Specification for Colour Picture Tube with Electrostatic Focussing and Electromagnetic Deflection for Colour Television Receivers' which was prepared by India under International Quality Assessment System for Electronics Components (IECQ).

This standard gives a proforma which is derived from the requirements of Generic Specification of colour picture tube [IS 13900 : 1993 'Generic Specification for Colour Picture Tube with Electrostatic Focussing and Electromagnetic Deflection']. It provides the detailed specification of the component, when filled at places marked '*' by the specification writer in accordance with the requirements and conditions specified in Generic Specification.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'.

Indian Standard

COLOUR PICTURE TUBE WITH ELECTROSTATIC FOCUSSING AND ELECTROMAGNETIC DEFLECTION FOR COLOUR TELEVISION RECEIVERS — BLANK DETAIL — SPECIFICATION

1 SCOPE

1.1 This document applies to picture tube with electrostatic focussing and electromagnetic deflection for Colour Television Receivers.

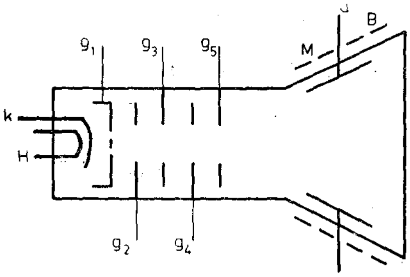
2 REFERENCES

2.1 The Indian Standards listed below are necessary adjuncts to this standard:

IS No.	*Title*
10673 : 1983	Sampling plans and procedures for inspection by attributes for electronic items
13900 : 1993	Generic specification for colour picture tube with electrostatic focussing and electromagnetic deflection

3 GENERAL

3.1 Outline Drawing



3.2 Letter Symbol

Letter Symbol	*Identification of the electrodes*
H	Heater
$g^{1 \cdots 5}$	Grids
k	Cathode
a	Anode
B	Implosion Protection Shield
M	External Conductive Coating

3.3 The picture tube shall be stored under following conditions:

Temperature	*	°C
Humidity (max)	*	%

3.4 Mechanical Data

3.4.1 *Main Dimensions*

—Overall length	*	mm
—Neck diameter	*	mm
—Diagonal	*	mm
—Horizontal axis	*	mm
—Vertical axis	*	mm

3.4.2 *Useful Screen Dimensions*

—Diagonal	*	mm
—Horizontal axis	*	mm
—Vertical axis	*	mm
—Area	*	cm^2

3.4.3 *Other Details*

—Base Type No.	*	
—Anode contact	*	
—Mounting position	*	
—Implosion protection	*	
—Mass (weight)	*	kg
—The dimensions and positions of the pins of the base are given in Fig.	*	

4 RATING AND CHARACTERISTICS

4.1 Limiting Values

Unless otherwise specified, all voltages are positive with respect to grid No. 1.

Parameter	*Min*	*Max*	*Unit*
—Anode Voltage	*	*	kV
—Total Anode Current Long Term Average	—	*	μA
—Focussing electrode voltage (Grid No. 3 or No. 3 & No. 5)	—	*	V
—Peak Grid No. 2 Voltage	—	*	V

Parameter	*Min*	*Max*	*Unit*
—Cathode Voltage			
Positive bias value	—	*	V
Positive operating cutoff value	—	*	V
Negative bias value	—	*	V
Negative peak value	—	*	V
—Heater Voltage			
AC (rms) or DC value	*	*	V
—Heater-Cathode Voltage			
(Heater negative with respect to cathode):			
After equipment warm-up period			
Peak Value	—	*	V
(Heater positive with respect to cathode):			
DC component value	—	*	V
Peak Value	—	*	V

4.2 Operating Conditions and Typical Characteristics

When the tube is operated under the conditions given below, the following characteristic values should be attainable.

4.2.1 *Operating Conditions*

Vg1 = *V; Vg2 = *V; Vg3 = *V; Vg4 = *V; Vg5 = *V; Vg6 = *V (as applicable), Beam current = *μA

Unless otherwise specified, voltage values are positive with respect to Grid No. 1.

4.2.2 *Characteristics*

—Anode Voltage	*	kV
—Focussing electrode voltage (Grid No. 3 or No. 3 & No. 5)	between * and *% of anode voltage	
—Grid No. 2 Voltages for Visual Extinction of Undeflected Focussed Spot		
At Cathode Voltage of * V	* V to * V	
At Cathode Voltage of * V	* V to * V	
At Cathode Voltage of * V	* V to * V	
—Maximum Ratio of Cathode Cutoff Voltages, Highest Gun to Lowest Gun (With grid No. 2 of gun having highest Cathode voltages adjusted to give * V spot cutoff)	*	
—Heater Voltage (max)	*	V
—Grid No. 2 Current (max)	* to * μA	
—Focussing electrode Current (Grid No. 3 or No. 3 & No. 5)	* to * μA	
—To produce White light of	*	*
—CIE Co-ordinates:		
X	*	*
Y	*	*
—Percentage of total anode current supplied by each gun		
Red	* %	* %
Blue	* %	* %
Green	* %	* %
—Ratio of cathode currents:		
Red to Green:		
Minimum	*	*
Typical	*	*
Maximum	*	*
—Red to Blue		
Minimum	*	*
Typical	*	*
Maximum	*	*
—Raster Centring Displacement Measured at the Centre of Screen		
Horizontal	* ± * max mm	
Vertical	* ± * max mm	
—Centre Convergence Displacement Between Blue and Red Beams	* max mm	
—Maximum Required correction (indicating effect of earth's magnetic field when using recommended components) as Measured at the Centre of the Screen in the Horizontal Direction	* max mm	
—Light transmittance at centre	* %	

4.3 Marking

4.3.1 The picture tube shall be attached with a label containing the following data:

- —Identification of the picture tube, allotted to it by the manufacturer,
- —Serial number,
- —The date of manufacture of the picture tube (the year and the month), in code or otherwise
- —Trade-mark,
- —Country of Manufacture, and
- —Safety warning.

4.3.2 The following data shall be indicated on the package:

- —Identification of the picture tube allotted to it by the manufacturer,
- —Trade-mark, and
- —The number of inspection lot.

5 TEST CONDITIONS AND INSPECTION REQUIREMENTS

5.1 Structural Similiarity

As specified in **4.2** of IS 13900 : 1993.

5.2 Qualification Requirements

As specified in **4.3** of IS 13900 : 1993.

6 LOT BY LOT TESTS (Group A)

6.1 Subgroup A1 Tests

6.1.1 General test conditions are to be filled by the specification writer at places marked **. (unless stated otherwise for particular tests).

6.1.2 All potentials are positive with respect to Grid No. 1 unless otherwise stated.

6.1.3 All tests are non-destructive.

Inspection or Test	*Reference IS 13900 : 1993*	*Conditions of Test*	*Inspection Requirements*				
			Min	*Max*	Units	IL	AQL
						100%	100%
—Visual inspection	5.2	**		*See* **5.2** of IS 13900 : 1993			
—Quality of fluorescent screen and face plate	5.5.18	**		*See* blemish specification in IS 13900 : 1993			
—Marking on tube	5.3	**		*See* **3.1.1** of IS 13900 : 1993			

6.2 Subgroup A2 Tests

Inspection or Test	*Reference IS 13900 : 1993*	*Conditions of Test*	*Inspection Requirements*				
			Min	*Max*	Units	IL	AQL
						II	1·5
—Total cathode current	5.5.1	**	*	*	μA		
—Heater current	5.5.2	**	*	*	μA		
—Heater cathode leakage	5.5.3	**	*	*	μA		
—Grid 1 leakage			*	*	μA		
—Grid 2 Leakage			*	*	μA		
—Grid 3 Leakage			*	*	μA		
—Voltage breakdown	5.5.4	**		No continuous arcing			
—Anode voltage breakdown	5.5.4	**		*			
—Stray emission	5.5.5	**		*			
—Current ratio	5.5.6	**		*			
—Red to Green				*			
—Red to Blue				*			
—Focussing voltage	5.5.7	**	*	*	V		
—Cathode spot cut-off voltage	5.5.8	**	*	*	V		
—Max ratio of cathode cutoff voltages, highest gun to lowest gun	5.5.9	**		*	V		
—Raster centring shift	5.5.11						
—Horizontal			*	*	mm		
—Vertical			*	*	mm		

6.3 Subgroup A3 Tests

Inspection or Test	*Reference IS 13900 : 1993*	*Conditions of Test*	*Inspection Requirements*				
			Min	*Max*	Units	IL	AQL
						S4	6·5
—Centre resolution	**5.5.12**	**	*				
—Capacitance between external coating to anode	**5.5.13**	**	*	*	pF		

6.4 Subgroup A4 Tests

Inspection or Test	*Reference IS 13900 : 1993*	*Conditions of Test*	*Inspection Requirements*				
			Min	*Max*	Units	IL	AQL
—Dimensions	**5.4**	*See* **5.4** of IS 13900 : 1993	*See* inspection drawing			S4	4·0

7 PERIODIC TESTS GROUP (C)

—General test condition — as for Group A.
—Only test marked (D) are destructive.
—AQL : given in %.

7.1 Subgroup C1 Tests

Inspection or Test	*Reference IS 13900 : 1993*	*Conditions of Test*	*Inspection Requirements*					
			Min	*Max*	Units	p	n	c
						6	8	1
—Outer beam convergence	**5.5.14**	**		*	mm			
—Centre beam convergence	**5.5.14**	**		*	mm			
—Implosion (D) protection	**5.5.23**	**						

7.2 Subgroup C2 Tests

Inspection or Test	*Reference IS 13900 : 1993*	*Conditions of Test*	*Inspection Requirements*					
			Min	*Max*	Units	p	n	c
						6	10	1
—Ionizing radiation	**5.5.17**	**		*	mR/h			
—Dry heat test	**5.5.19**	1. Initial measurements 2. Test with no electric load Temp : +70°C ±2°C Duration : 16 Hrs 3. Recovery : 2 Hrs 4. Final measurement —Visual inspection —Total cathode current —Grid Leakage currents						
—Damp heat test	**5.5.20**	1. Initial measurement 2. Test with no electric load Temp : 40°C Humidity : 95% RH Duration : 96 Hrs 3. Recovery : 2 Hrs						

Inspection or Test	Refrence IS 13900 : 1993	Conditions of Test	Inspection Requirements					
			Min	Max	Units	p	n	c
						6	10	1
		4. Final measurements —Visual inspection —Total cathode current —Grid Leakage current —Capacitance between external conductive coating and anode						
—Cold test	5.5.21	1. Initial measurements 2. Test with no electric load Temperature : −10°C Duration : 2 hours 3. Final measurements —Visual inspection —Total cathode current						
—Vibration test	5.5.22	1. Initial measurements 2. Test with no electrical load Freq. 10-30 Hz Acc. 1·1g One way sweep in 50 sec Duration 1 hour 3. Final measurements —Visual inspection —Total cathode current —Cutoff voltage —Stray emission						

7.3 Group D Tests

—General test conditions — as for Group A.
—Only tests marked (D) are destructive.

Inspection or Test	Reference IS 13900 : 1993	Conditions of Test	Inspection Requirements					
			Min	Max	Units	p	n	c
						24	8	1
—Interelectrode capacitance	5.5.15							
Grid No. 1 to all other electrodes		**	—	*	pF			
Focus electrode to all other electrodes		**	—	*	pF			
All cathodes to all other electrodes		**	—	*	pF			
—Resistance between metal hardware and external conductive coating	5.5.16	**	*	—	Mohm			
—Operating (D) Endurance	5.5.24	**	*					

NOTES

1 Inspection levels (IL) and acceptable quality level (AQL) are selected from IS 10673 : 1983 'Sampling plans and procedure for inspection by attributes'.

2 In the tables above :

P — Periodicity (in months)
n — Sample size
c — acceptance criterion

3 If any additional tests are included which are destructive, then these shall be marked (D).

4 The reference for measuring frequency for capacitance measurement is 1MHz. However frequencies ranging between 1 000 MHz and 5 MHz may also be used.

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Printed at Printrade, New Delhi, India